

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
10 September 2004 (10.09.2004)

PCT

(10) International Publication Number
WO 2004/076375 A2

- (51) International Patent Classification⁷: **C04B**
- (21) International Application Number:
PCT/US2004/005676
- (22) International Filing Date: 26 February 2004 (26.02.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/450,563 26 February 2003 (26.02.2003) US
60/499,453 2 September 2003 (02.09.2003) US
60/537,207 18 January 2004 (18.01.2004) US
- (71) Applicant (for all designated States except US): **CH2M HILL, INC.** [US/US]; 9191 South Jamaica Street, Englewood, CO 80112 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MALONEY, Martin, David** [US/US]; 29556 Kirkwood Court, Evergreen, CO 80439 (US). **WAGH, Arun, S.** [US/US]; 4 Helens Way Court, Naperville, IL 60565 (US).
- (74) Agents: **SWANSON, Barry, J. et al.**; **SWANSON & BRATSCHUN, L.L.C.**, 1745 Shea Center Drive, Suite 330, Highlands Ranch, CO 80129, ETATS-UNIS D'AMERIQUE (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— without international search report and to be republished upon receipt of that report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD OF WASTE STABILIZATION WITH DEWATERED CHEMICALLY BONDED PHOSPHATE CERAMICS

(57) Abstract: A method of stabilizing a waste in a chemically bonded phosphate ceramic (CBPC). The method consists of preparing a slurry including the waste, water, an oxide binder, and a phosphate binder. The slurry is then allowed to cure to a solid, hydrated CBPC matrix. Next, bound water within the solid, hydrated CBPC matrix is removed. Typically, the bound water is removed by applying heat to the cured CBPC matrix. Preferably, the quantity of heat applied to the cured CBPC matrix is sufficient to drive off water bound within the hydrated CBPC matrix, but not to volatilize other non-water components of the matrix, such as metals and radioactive components. Typically, a temperature range of between 100°C-200°C will be sufficient. In another embodiment of the invention wherein the waste and water have been mixed prior to the preparation of the slurry, a select amount of water may be evaporated from the waste and water mixture prior to preparation of the slurry. Another aspect of the invention is a direct anhydrous CBPC fabrication method wherein water is removed from the slurry by heating and mixing the slurry while allowing the slurry to cure. Additional aspects of the invention are ceramic matrix waste forms prepared by the methods disclosed above.

WO 2004/076375 A2